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Some Pathological and Other Conditions
observed among the Human Remains
from a Prehistoric Ethiopian Cemetery
in the Southern Sudan, Africa

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INDEPENDENT PAPER

SOME PATHOLOGICAL AND OTHER CONDITIONS
OBSERVED AMONG THE HUMAN REMAINS
FROM A PREHISTORIC ETHIOPIAN CEMETERY
IN THE SOUTHERN SUDAN, AFRICA

BY M. B. RAY, M.D. EDIN., AND L. H. DUDLEY BUXTON, B.A. OXON.

MATERIALS dealt with in this paper were excavated in a prehistoric Ethiopian cemetery by Mr. Henry S. Wellcome, and he has kindly permitted us to publish this brief paper in advance of his full report,

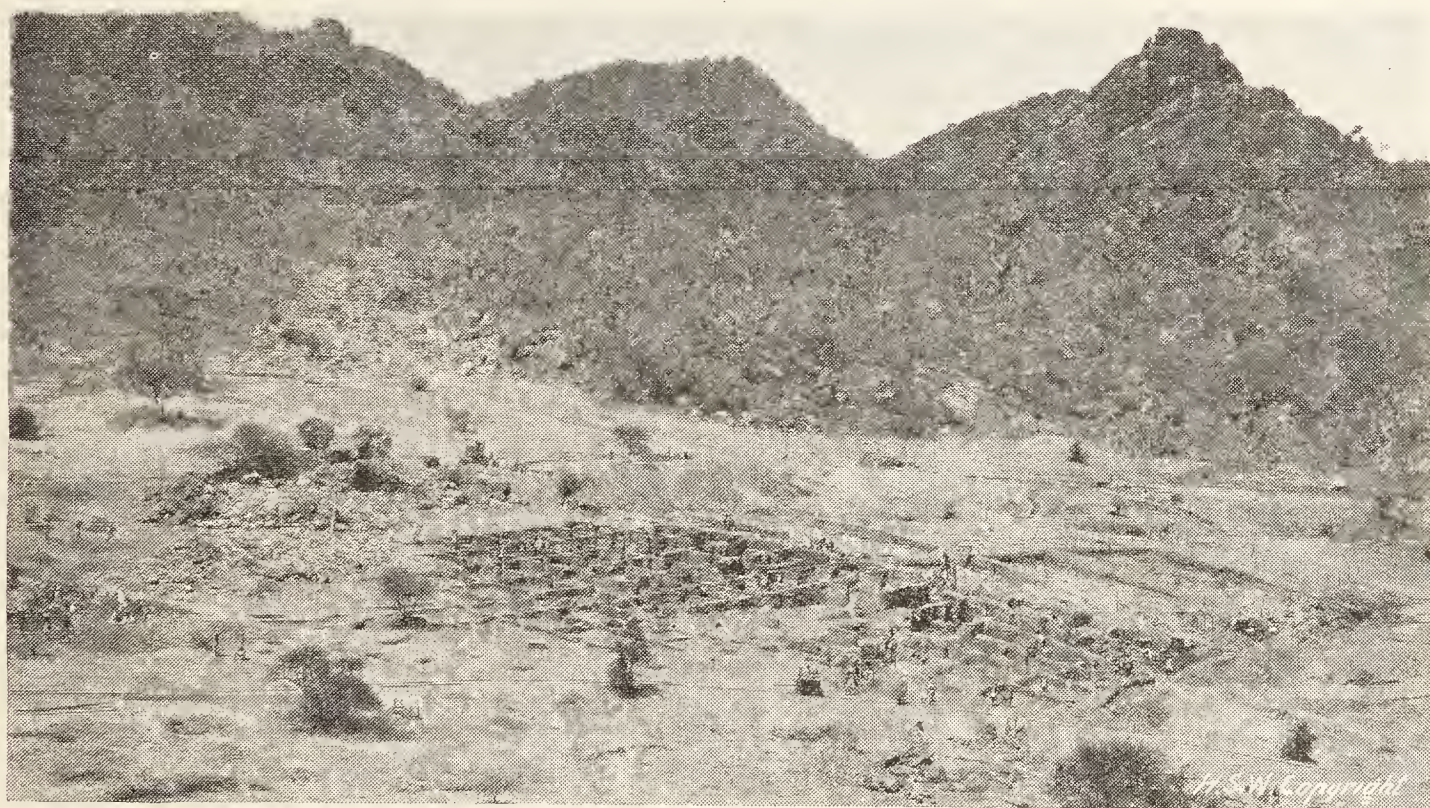


FIG. 1. Site of Mr. Wellcome's Archæological Excavations, Gebel Moya.

which will appear later on. The cemetery lies in the southern part of the Gezira, *i.e.* the tongue of land between the White and Blue Niles (Fig. 1). It is in North latitude $13^{\circ} 30'$, roughly speaking about level with Aden, and is estimated to be about 35 kilometres west of the Blue Nile, 75 kilometres east of the White, and about 320 kilometres south of Khartoum. No completed survey of this region has yet been made.

Gebel Moya itself is a range of granite hills rising to about 250 metres above the plain; the cemetery is situated in a sort of basin up among the hills. In the very brief rainy season this hollow receives from the surrounding extensive watersheds quantities of water, which rushes in torrents down a precipitous rocky gorge to the south-west of the cemetery. All around the Gebel the plain stretches, as far as eye can reach, a thick tangle of often impenetrable acacia thorn, broken only by open plains with many isolated clusters of granite rock looking like islands in the sea, and occasional patches of cultivation. At the latter end of the dry season, that is towards the end of March, when all the reservoirs are dry and the wells very low, migrations to the Niles take place, although at Gebel Moya—as the name water-hill suggests—there are some wells yielding a meagre supply of brackish water, and indications are not wanting that at one time there was more water than at present.

The water conditions are of great importance when we come to consider the preservation of the bones and also the fact that we have such a large populated centre and a cemetery in one place.

Having thus explained the source of the water-supply for the former inhabitants of Gebel Moya, let us consider their food, as this matter is very important for our present purpose. Such evidence as we have so far discovered leads us to believe that on the whole, in matter of diet, little change has taken place up to the present day. The staple food of the modern inhabitants is dhurra cakes and milk; meat is eaten, but as far as could be judged, very sparingly. The dhurra, which is the most important article in the diet of the agricultural Nilotic peoples, is a cereal related to a common English weed, *Holcus lanatus*, the Yorkshire fog-grass. Dhurra is solely a rain crop at Gebel Moya, and the rains only last about six or eight weeks. It grows quickly, often over 6 feet high, the heads often being very large. The grain is round and about the size of a small dried pea.

Now our archæological evidence shows us that in former times a cereal of some sort, whether dhurra or sesame or some other grain, was extensively used, for some of the commonest objects discovered are mullers and grindstones not dissimilar to those used at the present day in grinding the grain after it has been pounded in a mortar. Secondly, pits have been discovered in the cemetery site which were exactly similar to the pits which the present people use as granaries for storing the dhurra.

Next we have abundant osteological evidence that the ancient people possessed cattle, and indications that these latter played a very important part in their daily life. On the other hand, burnt bones, the invariable accompaniment of flesh-eating man, were few and far between, whereas at a different site, and probably of a different date, in the same range of hills, one of us examined the bones and found a very large proportion had been in the fire.

Turning now to a third point, without the consideration of which a discussion of the pathological conditions of any people would be incomplete,

let us try briefly to reconstruct the mode of life of the early inhabitants of Gebel Moya.

Numerous stone implements have been discovered, a large number of which are probably contemporary with the graves. These are mostly similar to those that would in Europe be called neolithic, and many exhibit considerable skill in the working and polishing of granite.

An extensive range of pottery, from very primitive to fine fabrics of beautiful types, has also been abundantly discovered. The people possessed ivory and ostrich eggs and made decorative lip-studs out of pottery and stone, sometimes wearing as many as seven in one lip. Special stress must be laid on this latter custom, as the wearing of lip-studs has considerable effect on the teeth.



FIG. 2.

So much then for general conditions. There are two special conditions, *i.e.* conditions which apply in particular to this cemetery, which must now be dealt with. First, in regard to date. Until the excavations are completed and the results fully studied, it is difficult at present to come to any definite conclusion on this point, but it is at least certain, from clearly datable evidence of objects found near the surface of the upper strata, that the latest of the burials can be dated about 700 B.C., and, from the fact that bodies are found in various lower strata to considerable depths, we may presume many of the bodies are of very remote antiquity (Fig. 2). Secondly, a noticeable feature of the bodies found is the large predominance of the females over the males; we have, however, discovered a sufficiently large number of males as to preclude the idea of a female cemetery. The explanation of this curious fact is uncertain; possibly wars may have been responsible for the destruction of the males away from home.

The pathology of the teeth of our specimens is of considerable interest. First, in regard to periodontal disease. We are very much indebted to Mr. F. J. Collier for his suggestions and help. Following Mr. Collier's

advice, we have classified the specimens under two headings: first, those in which the cause of the disease lies chiefly in the mechanical influence of food packing, especially in the first molar region. The alveolus in some cases has been so much absorbed that the teeth had fallen completely out of their sockets. In many of our specimens, the above condition was also accompanied by subcervical caries, which is well shown in the radiograph.

In direct contrast to these conditions, in a few cases we found that the subject was clearly suffering from general periodontal disease, accompanied by considerable rarefying osteitis. As might be expected from the comparative density of the two jaws, this condition usually first appears in the maxilla; indeed we very much doubt if any of the mandibles from Gebel Moya show evidence of general periodontal disease.

There are a number of specimens which show abscess cavities at the roots of the teeth, and in some cases the trouble has found an outlet not on the buccal surface of the maxilla, but in the antrum, or, in one example, the anterior part of the floor of the nasal aperture.

Crowding in the incisor region is not an uncommon feature; the chances of this are enhanced by the very large size of the central incisors—a racial characteristic. The crowding is sometimes masked by the extraction of the central incisors.

Where the extraction has not been performed, and in many cases where, owing to crowding, the operation has had little effect on the mouth, the front of the teeth present a very worn surface from the continual rubbing of the plug on the teeth.

Turning to the molar region, we find that in spite of the size of the jaws and of the teeth, the third molar suffers similar degeneration, and the case of an impacted molar is found as in modern conditions.

In comparing the general condition of the teeth in Gebel Moya specimens with those of modern Europeans, it is interesting to note that 'food packing' is much commoner in the Ethiopians than in Europeans; the latter, however, are much more subject to caries. The ancient inhabitants of Gebel Moya ground down the crowns of their teeth to a greater degree than any European in old age, though perhaps on the whole the ancient people under consideration kept their teeth better than we do; still, from what evidence we have, we may believe that they reached old age 'sans teeth, sans everything.' On the whole, however, they followed the Greek proverb, 'Those whom the gods love, die young.'

We have only observed one case of supernumerary teeth, that of a supernumerary premolar, and in one case the second premolar had three roots; this latter abnormality may of course have occurred more frequently without being observed.

We searched carefully for signs of osteo-arthritis, as there is evidence of the prevalence of this disease in Egypt at an early period, but we were only able to discover it in a very few cases; in one a fifth metatarsal, and in another one of the phalanges of the hallux, showed a characteristic

nodular appearance. In the case of the former example other bones of the same foot seemed to be affected.

One vertebra calls for special mention, as it is a particularly interesting case of arrested growth. The body of the vertebra (an eleventh dorsal) is almost crescent-shape owing to the fact that premature ossification of the growth centres took place. The skeleton was that of a young adult male, remarkable principally for its great size and for the muscular development of the arms.

We had expected to find considerable evidence of traumata on the bones, but as a fact we have few examples. Two depressed fractures are exhibited; they seem to be possibly due to a blow from a blunt instrument.

We found a certain number of fractured limbs. A very common form of injury among the ancient Egyptians, as Professor Elliot Smith and others have pointed out, is a fractured forearm. This was specially common among the women and is probably due to the effort to ward off the blow of a stick. The same form of injury due to the same cause is not uncommon among the modern Sudanese. However, it seemed unusual among the bodies we excavated. Fractured humeri occurred, and an example of a Pott's fracture calls for special mention as illustrating surgical skill of the ancient peoples, who probably got as good results as were attained in modern times until fractured ends were secured in apposition by mechanical means.



FIG. 3.

Calculi, vesical and biliary, were of common occurrence in the abdomina of the bodies we examined, and in some cases we were able to locate their exact position in the grave. A particularly fine specimen is illustrated (Fig. 3). This is very good because it shows the stones after they have escaped from the ruptured gall-bladder.

One skull was found with a large osteoma on the parietal bone. The tumour was hemispherical in shape, about two centimetres in diameter, and one centimetre high. We palpated the interior of the skull to discover if any pressure had been exerted on the brain, but the inner tablet showed no signs of abnormality.

Some of the specimens illustrating the various cases referred to in this paper are exhibited at the Historical Medical Museum.

Only a small number of the more than a thousand human remains discovered have yet been thoroughly dealt with. All, so far as their

condition will permit, are being carefully studied, and fully illustrated reports will be published as soon as practicable after the excavations are completed.

The burials thus far have mainly been on the border of the site, and where they have been most disturbed and exposed to damage. Mr. Wellcome is continuing his excavations, and when he reaches the centre of the site, it is anticipated that he will find still more interesting material in better condition, and which will throw some further light on pathological conditions as well as on the prehistoric races of Ethiopia, of which very little has hitherto been known.

Owing to the fact that our specimens, from being subjected alternately to torrential rains and extreme drought, were in a very brittle condition,



FIG. 4.

it was necessary to take special precautions for their preservation. As the result of a series of experiments, a special method was devised as follows: The skull or other bone to be treated was, while still *in situ*, cleansed as far as possible. It was then carefully scrubbed over with a paint-brush dipped in hot water. Then a piece of gauze roughly cut to the right shape was dipped in a strong solution of ordinary gelatine and spread over the surface of the bone (Fig. 4). In this way a covering was made which moulded itself on to the upper side of the bone. The specimen was allowed to dry—about half an hour. We found that if exposed too long to the tropical sun, the gauze cracked and peeled off. After raising the bone the under side was treated in the same way. We found that many skulls which would otherwise have fallen to pieces were by this method kept intact. The bones so treated stood the journey to England well, and the gauze is easily removed with warm water and a small brush.

